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Attorneys for Defendants

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ILLUMINA, INC. and ILLUMINA CAMBRIDGE LTD.,

Plaintiffs,

v.

BGI GENOMICS CO., LTD., BGI AMERICAS CORP., MGI TECH CO., LTD., MGI AMERICAS INC., and COMPLETE GENOMICS INC.,

Defendants.

Case Nos. 3:19-cv-03770-WHO
3:20-cv-01465-WHO

DEFENDANTS' NOTICE OF RENEWED MOTION AND RENEWED MOTION FOR JUDGMENT AS A MATTER OF LAW REGARDING INVALIDITY, NO WILLFULNESS, NO INDIRECT INFRINGEMENT, AND DAMAGES

Date: March 2, 2022
Time: 2:00 PM
Judge: The Hon. William H. Orrick

NOTICE OF RENEWED MOTION AND RENEWED MOTION

TO ALL PARTIES AND THEIR ATTORNEYS OF RECORD:

Please take notice that Defendants BGI Genomics Co., Ltd., BGI Americas Corp., MGI Tech Co., Ltd., MGI Americas Inc., and Complete Genomics Inc. (collectively, "CGI" or "Defendants") renew their motion for judgment as a matter of law that U.S. Patent Nos. 7,777,973 ("the '973 patent"), 7,566,537 ("the '537 patent"), 9,410,200 ("the '200 patent"), and 10,480,025 ("the '025 patent") (collectively, the "asserted patents") are invalid; that CGI did not willfully infringe any asserted patent; that CGI did not indirectly infringe; and that Plaintiffs Illumina Inc. and Illumina Cambridge Ltd. ("Illumina") are entitled to damages of no more than $295,000. Defendants' motion shall be heard on March 2, 2022 at 2:00 p.m., or as soon as this Court deems appropriate, in Courtroom 2, 17th Floor, of the United States District Court for the Northern District of California, located at 450 Golden Gate Ave., San Francisco, California 94102.

Defendants' Motion is made pursuant to Federal Rule of Civil Procedure 50. This Motion is based upon this notice and supporting memorandum, the trial record, and such other matters of which the Court may take judicial notice. Defendants respectfully request an order that, as a matter of law, the asserted patents are invalid, CGI did not willfully infringe any asserted patent, CGI did not indirectly infringe, and Illumina is entitled to damages of no more than $295,000.

DATED: January 11, 2022

Respectfully submitted,

QUINN EMANUEL URQUHART & SULLIVAN, LLP

By */s/ David Bilsker*
David Bilsker
Attorneys for Defendants BGI Genomics Co., Ltd., BGI Americas Corp., MGI Tech Co., Ltd., MGI Americas Inc., and Complete Genomics, Inc.

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LEGAL STANDARD

Judgment as a Matter of Law may issue against a party where the party "has been fully heard on [that] issue during a jury trial and the court finds that a reasonable jury would not have a legally sufficient evidentiary basis to find for the party on that issue." Fed. R. Civ. P. 50(a). Substantial evidence must exist to support the verdict and that is "more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1363 (Fed. Cir. 2004).

STATEMENT OF FACTS

Trial was held from November 15-22, 2021, and the jury returned a verdict that claim 3 of the '444 patent and claim 1 of the '025 patent were obvious, but that the remaining asserted claims were not invalid. *See* Dkt. No. 594 at 8-12.[1] The jury also found that Defendants induced infringement of some but not all of the asserted patents (the '444, '973, '537, and '200 patents) and contributed to the infringement of some but not all of the asserted patents (the '444 and '973 patents), that Defendants' infringement was willful, and awarded damages in the amount of $8,000,000. *Id.* at 2-7, 13. At trial, Defendants moved for judgment as a matter of law under Federal Rule of Civil Procedure 50(a) on these issues. Tr. 724:8-14, 1155:16-21.

ARGUMENT

I. CGI IS ENTITLED TO JMOL THAT THE '973, '537, '200, AND '025 PATENTS ARE INVALID

A. Substantial Evidence Does Not Support the Non-Obviousness of Claim 13 of the '973 Patent

1. The SBS Method of '973 Claim 13 Was Known Well Before 2002

Illumina first claimed that it had invented the three step process of sequencing-by-synthesis ("SBS"): 1) incorporating a complementary 3'-*O* blocked nucleotide into a growing primer strand, 2) detecting the nucleotide that had been incorporated, 3) removing the blocked

[1] All citations to the docket herein refer to Case No. 3:19-cv-1465-WHO unless otherwise noted.

nucleotide and repeating the process. *See, e.g.*, Tr. *167:2-168:8*[2]; PDX-1.36-52; Tr. *237:8-15*. This was untrue. At least five references described that process before Illumina was even formed.[3] *See* Tr. 797:8-13, 797:22-798:25. The shared specifications of three of the asserted patents attribute the three-step SBS process to the 1989 Cheeseman patent, 5,302,509 ("'509 patent"). *E.g.* JTX12 col. 1:61-2:5. Dr. Romesberg later admitted the same. *See* Tr. *1104:22-1105:14*. Finally, in its closing argument rebuttal, Illumina admitted that it had not invented the SBS process. Tr. *1315:19-25*. Thus, the only issue on claim 13 is whether using a 3'-*O* azidomethyl blocking group in the SBS process of Parce (JTX34) was obvious.

2. Illumina Admitted the Selection of Azidomethyl Was Obvious

Illumina's '537 patent (JTX83) is a divisional of U.S. Application No. 10/227,131 ("'131 Application"),[4] filed on August 23, 2002. The '537 patent specifically attributes the three-step SBS process to the Cheeseman '509 patent. JTX83 col. 1:44-55. The '537 then states that POSAs already know how to select blocking groups for SBS. *See, e.g.*, *id.* col. 7:65-67. For that reason, it provides no teaching about how to identify useful blocking groups. The only blocking group the '537 mentions by name is "carbonyl." *Id.* col. 6:35-38. When explaining what other 3'-*O* protecting groups to use in SBS, Illumina stated: "Suitable protecting groups ***will be apparent to the skilled person***, and can be formed from any suitable protecting group disclosed in Green and Wuts, supra." *Id.* col. 7:65-67 (emphasis added). Illumina follows that admission by saying, "Some examples of such protecting groups are shown in Fig. 3." *Id.* col. 7:67-8:1. Fig. 3 is a listing of twenty generic formulas that amount to more than a million possible blocking groups. *See, e.g.*, Tr. 847:4-17; *id.* at *1063:25-1064:5*.[5] Azidomethyl is never named in the '537

2 For clarity, citations to testimony from Illumina witnesses or to Illumina's counsel's argument appear in *underlined italics*.

3 Illumina bought its sequencing technology from Solexa, formed in 2000. *See* Tr. *237:8-15*.

4 All of the asserted patents claim priority to this application.

5 With this many possibilities, selection would have to be part of the common knowledge or the patents would fail the written description and enablement requirements. *See, e.g.*, *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1126 (Fed. Cir. 2008); *Amgen Inc. v. Sanofi, Aventisub LLC*, 987 F.3d 1080, 1088 (Fed. Cir. 2021); *Wyeth & Cordis Corp. v. Abbott Lab'ys*, 720 F.3d 1380, 1384 (Fed. Cir. 2013).

specification. In fact, azidomethyl was not particularly identified until 2007, when Illumina amended the '537 claims. *See* JTX85-132 through JTX85-135 (Aug. 13, 2007 amendment adding Claim 28).

The '537 also lacks any teaching regarding removal of blocking groups in general, or azidomethyl in particular. Again, Illumina admitted that how to remove a 3'-*O* protecting group for SBS was already known by a POSA. Thus, the '537 specification contains only two minimal passages relating to the removal of a 3'-*O* protecting group. First, Illumina stated that the protecting group: "can be removed under defined conditions to allow polymerisation to occur." JTX83 col. 7:52-54. Second, Illumina stated that: "The protecting group should be removable (or modifiable) to produce a 3' OH group. The process used to obtain the 3' OH group can be any suitable chemical or enzymatic reaction." *Id.* col. 8:1-4.

Illumina' lack of teaching and statements that a POSA already knows how to select and remove an appropriate blocking group from the millions identified in Fig. 3 is binding on Illumina. *See McCoy v. Heal Sys., LLC*, 850 F. App'x 785, 789 (Fed. Cir. 2021) (affirming finding that statements in the specification about what was "conventional" and "known to a POSA" are binding on the patentee); *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1362 (Fed. Cir. 2007) ("Admissions in the specification regarding the prior art are binding on the patentee for purposes of a later inquiry into obviousness."). Given those binding admissions, a reasonable juror could only find that the use of a 3'-*O* azidomethyl blocked nucleotide in the SBS of claim 13 is obvious in light of the teachings in Parce (JTX34), Zavgorodny (JTX7 and JTX51), and Kovacs (TX-3038).

3. Trying Azidomethyl in Parce's SBS Method Was Obvious

(a) Parce Teaches Looking for Blocking Groups in References Like Zavgorodny

Parce indisputably teaches claim 13's three-step SBS method. Tr. 832:18-833:24; *id.* at *1104:22-1105:14*. Parce identifies two preferred SBS 3'-*O* blocking groups, phosphate and carbamates. JTX34 col. 12:12-17; Tr. 835:14-23. Parce also teaches looking for other blocking groups to use in references like the Green textbook (JTX34 col. 12:12-17; Tr. 835:24-836:12) that,

years later, Illumina pointed to (*e.g.* JTX83 col. 7:65-67). Parce's direction to a textbook on organic synthesis shows that organic synthesis references are the type of place a POSA would look for 3'-*O* blocking groups. Tr. 835:24-836:23.[6]

Dr. Romesberg testified that Zavgorodny (JTX7, JTX51) is an organic synthesis reference. Tr. *1031:7*. Zavgorodny teaches a 3'-*O* azidomethyl blocking group on a nucleoside, which is extremely similar to nucleotides used in SBS. Tr. 790:17-24, 799:7-12, 810:4-19, 811:15-19. The jury found an azidomethyl nucleotide is obvious in light of Zavgorodny. Dkt. No. 594 at 8. Illumina admitted in 2002 in the '537 patent that a POSA already knew how to select, from among millions of possibilities, blocking groups that were appropriate for use in SBS with no direction whatsoever. Consequently, a POSA in 2002, with all the existing knowledge on how to pick appropriate blocking groups, would find that each of the already known guideposts made Zavgorodny's 3'-*O* azidomethyl blocking group obvious to try in Parce's SBS method and there would have been an expectation of success.

(b) POSAs Knew That Small Groups Were Preferred in SBS

The unrebutted evidence shows that it was well known to those of skill in the art to try smaller 3'-*O* blocking groups to use in SBS. Tr. *1108:9-23*; *id.* at 836:24-837:6, 837:22-838:9; *see also id.* at 569:23-570:3. The prior art recognized as early as 1994 that large, bulky blocking groups could interfere with polymerase activity and that smaller blocking groups were more likely to be incorporated. *Id.* at 839:16-841:23; TX-3258.7; DDX-3.33. The unrebutted testimony also showed that azidomethyl, which is an ether, was smaller and known to have a better chance of being incorporated by a DNA polymerase compared to the larger blocking groups that Parce suggested using, which are esters. Tr. 838:18-839:15, 841:10-23; DDX-3.33. Thus, one of skill in the art, knowing that small groups are preferred because polymerase is more likely to incorporate them, would have been motivated to try azidomethyl as a blocking group because it is even smaller than the groups Parce taught to use.

[6] Cheeseman's '509 patent also directs POSAs to organic synthesis textbooks. '509 patent col. 6:4-10.

(c) Polymerase Incorporation of AZT Suggested Using Azidomethyl

The unrebutted testimony shows that a POSA would have anticipated that existing polymerases would incorporate azidomethyl, and thus be potentially useful as a 3'-*O* blocking group in SBS, because polymerase incorporated a very similar molecule, the antiviral AZT.[7] Tr. 585:9-586:8; *id.* at 818:23-820:20, 821:12-18. AZT is chemically similar to azidomethyl: AZT is comprised of a 3' N_3 (azido) group, while azidomethyl adds a small, inert CH_2 group to the N_3. *Id.* at 819:17-820:7. POSAs knew polymerases incorporated AZT into a growing chain of nucleotides, just like is done in SBS, to work as an antiviral. *Id.* at 586:16-587:18; *id.* at 793:23-794:7, 819:17-821:11. The fact that polymerase was known to incorporate AZT and allyls, which are both very similar in size and shape to azidomethyl, provided motivation to a POSA to try azidomethyl in Parce's SBS method. Tr. 586:25-587:11, 842:2-10.

(d) Zavgorodny Combined with Kovacs Provides Motivation to Try Azidomethyl in SBS

Zavgorodny's teachings also would have also led a POSA to try the azidomethyl blocked nucleotide in Parce's SBS method. Zavgorodny teaches that one can use the 3'-*O* azidomethyl blocked nucleoside as a potential antiviral. JTX7-2. A POSA would know that testing a blocked nucleoside as a potential antiviral would involve converting it into a nucleotide and then seeing whether it would be incorporated by a polymerase. Tr. 822:8-19. Kovacs (TX-3038) details this process and teaches a particular method to convert nucleosides into nucleotides to study incorporation by polymerase. TX-3038.1; Tr. 824:3-17, 826:15-827:4; DDX-3.25. Kovacs teaches using a common polymerase, Klenow fragment, for the blocked nucleotide incorporation studies. TX-3038.1; Tr. 848:3-21. A POSA following this teaching for a common way to evaluate a blocked nucleotide as a potential antiviral, would have found that in fact it did incorporate.[8]

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[7] Dr. Romesberg admitted that the mechanism for how polymerase incorporates blocked nucleotides and terminates further synthesis in antivirals is virtually identical to how they work in SBS. Tr. *1099:8-20*.

[8] Illumina confirmed that Klenow polymerase would incorporate a 3'-*O* blocked nucleotide and even claimed that combination in 2015. *See, e.g.*, JTX84 claim 13.

Having followed the teachings of Zavgorodny and Kovacs to test a 3'-*O* azidomethyl blocked nucleoside as a potential antiviral, a POSA would have understood that it satisfied a common feature of 3'-*O* blocked nucleotides used in sequencing and as antivirals: incorporation by a polymerase. Tr. 790:25-791:23, 823:20-824:2, 848:3-21. This would have confirmed the teaching that small blocking groups such as a 3'-*O* azidomethyl blocked nucleotide are preferred, and would have motivated a POSA to try Zavgorodny's 3'-*O* azidomethyl blocked nucleotide in Parce's SBS method. Tr. 842:2-10, 847:18-848:21; Tr. *1108:9-23*.

(e) Parce's Use of TCEP Steers a POSA to Zavgorodny's 3'-*O* Azidomethyl Blocking Group

Parce's teaching that it is beneficial to simultaneously remove the blocking group and label attached with a cleavable linker also directs a POSA to use Zavgorodny's 3'-*O* azidomethyl blocking group. JTX34 col. 16:11-14; *see also* Tr. 842:11-843:6. Parce teaches using TCEP to cleave the linker and remove the blocking group. *E.g.* JTX34 claim 11; Tr. 842:11-25; *id.* at *1108:4-7*. TCEP in combination with Zavgorodny's 3'-*O* azidomethyl would accomplish the simultaneous removal Parce strives for and is wholly consistent with Zavgorodny's teaching of how to remove the 3'-*O* azidomethyl blocking group.

As experts, inventors, and Illumina employees agreed, Zavgorodny teaches the well-known Staudinger reaction to remove the 3'-*O* azidomethyl block from the nucleoside. JTX7-5; Tr. 578:4-17; Tr. 828:12-829:10; Dkt. No. 571-17 *(Milton) at 45:21-46:21, 46:24-47:8, 47:10-19*; Dkt. No. 571-18 *(Pickering) at 151:1-10, 151:12-13*. The unrebutted testimony shows that a POSA knew how to select different phosphines in the Staudinger reaction depending on the particular application. Dr. Milton, the head of chemistry at Solexa and a named inventor, explained that organic chemists normally start with TPP in the Staudinger reaction as Zavgorodny did because it is a ubiquitous chemical that organic chemists have on their shelf. Dkt. No. 571-17 *(Milton) at 48:9-15, 48:25-49:9.* Once they show a reaction works with that phosphine, they then select a phosphine for the particular application at hand. Dkt. No. 571-17 *(Milton) at 22:23-23:19, 24:6-22, 24:24-25:3, 26:1-6, 26:16-27:7, 47:1-8, 47:10-19, 47:22-48:14, 48:25-50:2*; Tr. 843:11-844:17. A POSA knew by 2002 that they should work in aqueous conditions with aqueous

reagents when sequencing DNA. Dkt. No. 571-13 (*Balasubramanian) at 131:20-132:1, 137:13-17, 137:19-22*; Dkt. No. 571-16 *(Liu) at 157:7-158:4, 158:6-8*; Dkt. No. 571-17 *(Milton) at 24:17-25:3*; Tr. 843:11-844:17; TX-3258.1; Tr. 580:4-24, 581:11-16. The phosphine Parce identifies, TCEP, is aqueous and it would be straightforward to use it as the phosphine in the Staudinger reaction Zavgorodny describes to remove the 3'-*O* azidomethyl block. Tr. 578:23-580:24, 581:11-16; *id.* at 842:11-843:6, 844:1-17; Dkt. No. 571-17 *(Milton) at 48:9-15, 48:25-50:2*; TX-3258.1; *cf.* JTX84 col. 8:36-42.

Thus, all of the evidence shows that a POSA would be directed to try Zavgorodny's 3'-*O* azidomethyl block in Parce's SBS method, and would have an expectation of success in so doing:

- Zavorodny's teaching to use the Staudinger reaction, JTX7-5; Tr. 578:4-17; *id.* at 828:12-829:10;
- Parce's teaching that TCEP will not harm DNA and is a suitable phosphine to use in SBS sequencing, Tr. 592:7-19, 593:8-594:9; *id.* at 844:1-17;
- a POSA's knowledge that phosphines are selected for the Staudinger reaction depending on the application, Dkt. No. 571-17 *(Milton) at 22:23-23:19, 24:6-22, 24:24-25:3, 26:1-6, 26:16-27:7, 47:1-8, 47:10-19, 47:22-48:14, 48:25-50:2*; Tr. 580:21-25, 581:11-16; *id.* at 843:11-844:17, and
- a POSA's knowledge that aqueous reagents should be used in sequencing, Dkt. No. 571-13 (*Balasubramanian) at 131:20-132:1, 137:13-17, 137:19-22*; Dkt. No. 571-16 *(Liu) at 157:7-158:4, 158:6-8*; Dkt. No. 571-17 *(Milton) at 24:17-25:3*; Tr. 580:4-24, 581:11-16; 843:11-844:17; TX-3258.1.[9]

(f) The Obviousness of '444 Claim 3 Solidifies That '973 Claim 13 Is Obvious as Well

The jury found Zavgorodny made a 3'-*O* blocked nucleotide obvious. The '973 patent simply claims using that obvious nucleotide for one of its most common applications, sequencing. *See, e.g.*, TX-3258.1; Tr. 790:17-791:5; *id.* at *1019:14-18*. '973 claim 13 covers the already well-known three-step SBS method in its most limited form, the performance of only two cycles. Tr.

[9] These factors are significantly more robust than what Illumina teaches years later. *See, e.g.*, JTX83 col. 7:65-8:4.

801:11-24, 831:9-832:8; *id.* at *1109:7-12*. There is no viable reason why a POSA[10] would not have tried Zavgorodny's 3'-*O* azidomethyl block in SBS. As discussed above, all the signposts pointed to trying a 3'-*O* azidomethyl block in Parce's method with an expectation of success.

(g) Prior Findings Do Not Diminish Obviousness

The prior proceedings that Illumina relied on throughout the trial pertained to a single patent and did not deal with the combinations at issue here or a significant majority of the unrefuted evidence that was presented during trial. For example, the prior proceedings did not have the benefit of testimony showing that Zavgorodny taught the Staudinger reaction, that those of ordinary skill in the art knew to substitute phosphines in that reaction depending on the application, and that a POSA knew to use aqueous reagents when sequencing. Nor did the prior proceedings have the benefit of the undisputed evidence showing that the mechanism of incorporating 3'-*O* blocked nucleotides is the same for sequencing, antivirals, and mechanistic studies. TX-3258.1; Tr. 790:3-791:23, 823:12-824:2; *id.* at *1099:8-20*. Moreover, the combinations relied on here, *i.e.*, Zavgorodny combined with Parce and Kovacs, were not at issue in any of those prior proceedings. In prior proceedings, the SBS references required their SBS methods to be more efficient than what the '537 patent claimed. But here, just like the '973 patent, Parce has no such efficiency requirement.[11] Tr. 852:7-855:17; *id.* at *1115:25-1116:23*. In fact, Dr. Romesberg testified that the SBS process could be useful even if it took two days to complete one incorporation and deblocking cycle and Parce, like the '973, simply requires two cycles of SBS to be performed without any efficiency requirement. Tr. *1109:3-12*, *1111:20-24*, *1112:16-1113:3*.

[10] *See In re Carlson*, 983 F.2d 1032, 1038 (Fed. Cir. 1992), *as revised on reh'g* (Feb. 1, 1993) (a POSA "is presumed to know all the pertinent prior art").

[11] Moreover, Illumina successfully argued in a prior proceeding that a POSA would be motivated to achieve even modest success, despite the costs or inefficiencies. *See* Final Written Decision at 44, 46-47, *Illumina, Inc. v. Tr. Columbia Univ.*, No. IPR2018-00797 (P.T.A.B. Sept. 9, 2019) (finding that "a person of skill in the art would have been interested in sequencing even short DNA sequences" and would have "pursu[ed] all possible sequencing methods even if the methods were relatively expensive or inefficient (compared to modern standards)" and noting that "there (footnote continued)

Last, arguments that had been addressed with respect to the '537 patent, such as studies on AZT incorporation, TCEP harming DNA, and incomplete cleavage of azidomethyl (based on entirely different references), were refuted and not even challenged by Illumina. First, with respect to AZT incorporation, the unrebutted testimony shows that the Boyer reference Illumina had relied on to purportedly show that AZT would not incorporate actually studied AZT that had already been incorporated. Tr. 585:9-586:15. It was only ***after*** AZT was incorporated that it interfered with the active site of the polymerase for the next incorporation, which is not relevant to SBS since the blocking group is cleaved before incorporation of the next nucleotide. *Id.*; *see also* Tr. 849:5-20. Second, Defendants rebutted Illumina's argument in the '537 IPR that, based on the Stanton reference, TCEP would harm DNA, and Illumina did not even attempt to show otherwise refute Defendants' testimony at trial. Tr. 588:14-590:15; *id.* at 850:21-851:18. Stanton described a method where a specifically engineered nucleotide, which is not the one used in SBS, was designed to have TCEP alter portions of the nucleotide. Tr. 850:21-851:18. The undisputed testimony shows that multiple references, including Parce, taught the use of TCEP in SBS without damage to DNA. Tr. 842:11-25, 844:1-17, 849:21-850:20. Third, with respect to incomplete cleavage of azidomethyl, the undisputed testimony shows that the reference Illumina relied on (Loubinoux) did not show that azidomethyl could only be cleaved to a 60-80% extent. Tr. 583:1-584:14. Rather, the data showed that 60-80% was the amount recovered after the cleaved products were purified. *Id.* The undisputed testimony shows that a POSA would know that the cleavage was complete. Tr. 584:9-14. Prior art references like Polushin showed that TCEP completes cleavage quickly and with no damage to DNA. Tr. 590:11-15. Illumina's expert, Dr. Romesberg, agreed with Dr. Drmanac and stated that yield after purification is not the same as cleavage efficiency. Tr. *1051:15-25*.[12]

was a reasonable likelihood of overcoming any incorporation obstacles, even if at some cost or effort, to achieve at least modest SBS sequencing success").

[12] In any event, because efficiency is not a requirement in Parce, even if cleavage were incomplete, it would not be a deterrent to using azidomethyl and TCEP.

(h) Secondary Considerations Do Not Save the '973 Patent

There is insufficient evidence in the record to support a conclusion that azidomethyl is responsible for the commercial success of Illumina's products. In fact, the evidence shows that the Illumina technology using azidomethyl was a complete failure until Illumina purchased the cluster generation technology from another company. Tr. 918:19-919:5. Thus, if anything can be identified as responsible for the success of the Illumina products, it is the cluster technology, not azidomethyl. This is further supported by the testimony of inventor Milton who did not even identify the use of azidomethyl at Illumina as an accomplishment worthy of note. Dkt. No. 571-17 *(Milton) at 106:5-7, 106:10-21*. In any event, any purported secondary considerations cannot overcome the clear case of obviousness in this case. *Nalpropion Pharms., Inc. v. Actavis Lab'ys FL, Inc.*, 934 F.3d 1344, 1356 (Fed. Cir. 2019) (secondary considerations could not overcome clear record showing obviousness).

B. '973 Claim 13 Does Not Satisfy the Written Description Requirement

Substantial evidence does not support a finding that claim 13 satisfied the written description requirement. Claim 13 covers the use of incorporated unlabeled nucleotides. Because the specification fails to convey to a POSA that the inventors possessed such an invention, the claims are invalid for lack of written description. *Nuvo Pharms. (Ireland) Designated Activity Co. v. Dr. Reddy's Lab'ys Inc.*, 923 F.3d 1368, 1380–81 (Fed. Cir. 2019); *Idenix Pharms. LLC v. Gilead Scis. Inc.*, 941 F.3d 1149, 1163 (Fed. Cir. 2019) (finding no written description for certain "nucleosides that fall within the boundaries of the claim . . . but are not encompassed by the explicit formulas or examples provided in the specification").

The '973 patent contains no unlabeled embodiments. The '973 patent contains no embodiments using unlabeled nucleotides. Dkt. No. 216 at 12. Dr. Metzker testified that there is no teaching in the '973 of using unlabeled nucleotides or monitoring sequential incorporation with unlabeled incorporated nucleotides. Tr. 856:7-859:20.[13] Last, the inventors testified they had

[13] It was not common knowledge at the time of the '973 filing to use unlabeled nucleotides in SBS. Tr. 859:21-860:16.

never contemplated using unlabeled incorporated nucleotides in the method of claim 13. Dr. Balasubramanian testified that he only contemplated the use of labeled incorporated nucleotides. Dkt. No. 571-13 (*Balasubramanian) at 311:6-312:4*. Dr. Liu testified that he was not aware of anyone monitoring the incorporation of unlabeled nucleotides in an SBS system at Solexa. Dkt. No. 571-16 *(Liu) at 310:3-8, 310:11-5*. Similarly, Dr. Brennan testified that there needed to be a label and that he was not aware of any unlabeled approaches. Dkt. No. 571-15 *(Brennan) at 35:23-37:5, 38:6-14, 38:16-17*. The inventor testimony coupled with the lack of any disclosure of monitoring with unlabeled nucleotides demonstrates the claim is invalid under the written description requirement. *Cf. Nuvo.*, 923 F.3d at 1381 (inventor's testimony showed that he only had a hope that one species of the claimed genus would work); *Juno Therapeutics, Inc. v. Kite Pharma, Inc.*, 10 F.4th 1330, 1337-38 (Fed. Cir. 2021) (finding no written description where the inventor testified that at the time of the invention he only used one species of the broad genus claimed).

Despite this evidence, Illumina made two arguments to overcome the lack of written description. First, it claimed that the specification does disclose incorporating unlabeled nucleotides using antibodies for detection just like CoolMPS does. Tr. *1061:12-17*. Substantial evidence does not support this. The antibodies described in the '973 patent are part of a multi-component label in which the first part, which the patent calls "a label," is attached to each of the four nucleotides when it is incorporated, and then a second part subsequently attaches to all the labels on the incorporated nucleotides for detection.

> ***Multi-component labels*** can also be used in the invention. A ***multi-component label is one which is dependent on the interaction with a further compound for detection***. The most common multi-component label used in biology is the biotin-streptavidin system. ***Biotin is used as the label attached to the nucleotide base***. Streptavidin ***is then added separately*** to enable detection to occur. Other multi-component systems are available. For example, dinitrophenol has a commercially available fluorescent antibody that can be used for detection.

JTX38 col. 15:52-60 (emphasis added). This teaching is simply another example of an embodiment where labeled nucleotides are incorporated. Quite oppositely, CoolMPS incorporates unlabeled nucleotides and then uses different antibodies that are specific to a nucleotide base and to the blocking group on the last incorporated nucleotide for the detection. Tr. 596:20-597:19.

This unlabeled improvement provides better signals and avoids problems that polymerases have with: 1) incorporating labeled nucleotides; 2) the unnatural scars left behind when the labels with linkers are removed. *Id.*; Tr. 595:9-596:10.

Illumina admitted that the experiments shown in '973 Figs. 5 and 6 used labels, but attempted to show that a POSA would know they were not necessary for detecting incorporation on the gel.[14] Tr. *1071:10-23*. Dr. Romesberg's testimony conclusively demonstrates that the written description requirement is not satisfied. *See Goeddel v. Sugano*, 617 F.3d 1350, 1356 (Fed. Cir. 2010) (finding no written description and rejecting argument that "a person of skill in the art could 'envision' the invention"). The inclusion of labels even when Illumina argues that they are entirely unnecessary to detect what had been incorporated shows that the inventors only had in mind incorporating labeled nucleotides. There is no other reason why something that has no use would be included.

The labeled nucleotides were used in these non-sequencing experiments because they were necessary first steps in the proof-of-concept for actual sequencing.[15] To be relevant proxies for the claimed actual sequencing, labels needed to be present on the nucleotides to show that polymerase would incorporate them as would be required for monitoring in the actual sequencing the inventors contemplated. Tr. 859:3-20; *see Knowles Elecs. LLC v. Cirrus Logic, Inc.*, 883 F.3d 1358, 1366 (Fed. Cir. 2018) (finding no written description of a "solder reflow process" means of attachment where patentee contended that a "solder reflow process" was known but the inventors selected a different means of attachment in every example in the patent, showing that the inventors did not contemplate a "solder reflow process").

[14] With respect to written description and enablement regarding sequentially monitoring complementary incorporated nucleotides without labels, when more than one nucleotide is introduced into the reaction at once, on summary judgement those embodiments were construed as being outside the scope of claim 13 of the '973. Dkt. No. 469 at 7-9.

[15] Dr. Metzker testified that these experiments did not teach a POSA how to sequentially monitor incorporation in SBS without using nucleotides that were unlabeled when incorporated. Tr. 857:11-860:16.

C. Substantial Evidence Does Not Support the Non-Obviousness of the '537, '200, and '025 Patents

Each of the claims in these patents adds only one thing to what is claimed in the '973 patent: that there be a label attached to the base of the azidomethyl blocked nucleotide via a cleavable linker. Tr. 861:9-14; DDX-3.44; Tr. *1074:3-7*. Attaching a label to the base of a blocked nucleotide used in SBS was already well-known. For example, Dower, Tsien, and Parce (JTX34 col. 5:48-50, 5:64-65) all teach detectable labels attached to the base, and cleavable linkers were commonly known in the field by 2000. Tr. 862:4-863:2, 863:6-23. This evidence was undisputed. In fact, when Illumina briefly addressed the issue of cleavable linkers attaching detectable labels to the base in an SBS system, the only testimony its expert provided was that this was "conventional chemistry known in the field." Tr. *1063:3-7*. All of the evidence thus shows that it was known before Illumina filed its patents to use a cleavable linker to attach a detectable label to the base so that the label could be removed before incorporation of the next nucleotide. Tr. 863:9-23. Because this requirement is the only addition compared to the '973 claims (and because this requirement was well-known in the art), the '200, '537, and '025 patents are invalid as obvious for the same reasons described above, and no reasonable jury could have found these patents nonobvious.

For all these reasons, JMOL of invalidity based on obviousness should be granted for the '973, '025, '200 and '537 patents. Further, JMOL of invalidity based on failure to satisfy the written description requirement should be granted for the '973 patent.

II. CGI IS ENTITLED TO JMOL OF NO WILLFULNESS

A. Willfulness Requires Knowledge of and Intent to Infringe a Specific Patent

Willfulness requires a showing that an accused infringer had knowledge of a patent and a deliberate intent to infringe that patent at the time of the challenged conduct. *SRI Int'l, Inc. v. Cisco Systems, Inc.*, 14 F.4th 1323, 1326-28 (Fed. Cir. 2021). A party "cannot be found to have 'willfully' infringed a patent of which the party had no knowledge." *Gustafson, Inc. v. Intersystems Indus. Products, Inc.*, 897 F.2d 508, 510-11 (Fed. Cir. 1990); *SRI v. Cisco*, 14 F.4th at 1326-28; *State Industries, Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1136-37 (Fed. Cir. 1985);

Apple v. Samsung Electronics Co., Ltd., 258 F. Supp. 3d 1013, 1024 (N.D. Cal. 2017). General knowledge of a patentee's portfolio, or knowledge of related patents, without specific knowledge of each asserted patent, is insufficient to satisfy the knowledge requirement of willfulness. *Finjan, Inc. v. Cisco Sys. Inc.*, No. 17-CV-00072-BLF, 2017 WL 2462423, at *5 (N.D. Cal. June 7, 2017); *Longitude Licensing v. Apple Inc.*, No. C-14-04275-EDL, 2015 WL 1143071, at *2 (N.D. Cal. Mar. 13, 2015); *Radware, Ltd. v. F5 Networks, Inc.*, No. 5:13-cv-02024, 2016 WL 44247490, at *5 (N.D. Cal. Aug. 22, 2016).

The patentee must also present sufficient evidence for a reasonable jury to conclude that the accused infringer acted with the requisite "state of mind" for a willfulness finding. *See, e.g.*, *Bayer Healthcare LLC v. Baxalta Inc.*, 989 F.3d 964, 987-88 (Fed. Cir. 2021); *Stickle v. Heublein, Inc.* 716 F.2d 1550, 1565 (Fed. Cir. 1983). In analyzing whether the intent requirement is met, the totality of the circumstances must be considered. *Gustafson*, 897 F.2d at 510-11; *Rite-Hite Corp. v. Kelley Co., Inc.*, 819 F.2d 1120, 1125-26 (Fed. Cir. 1987). Circumstances to be considered include the closeness or complexity of the legal and factual questions presented, whether there was independent invention, attempts to design around and avoid the patent, or any other factors tending to show good faith. *See SRI Intern. v. Adv. Tech. Labs.*, 127 F.3d 1462, 1465 (Fed. Cir. 1997). There is no universal rule that to avoid a willfulness finding, a party must immediately cease manufacture of a product upon learning of a patent, or upon filing of suit, if it has a good faith belief that it has a legitimate defense. *See Gustafson*, 897 F.2d at 511.

However, Illumina's express trial strategy was ***not*** to prove that CGI had knowledge of each specific asserted patent or intent to infringe that patent. As its counsel stated, "where you have willful infringement and it doesn't go by patent. And that's not defective because you haven't been able to show which of the patent -- like, you have to show -- you don't have to then show evidence that each individual patent is there." Tr. 545:4-17. Rather, Illumina repeatedly blurred all the asserted patents and accused products together, using phrases such as "Illumina's patented azido rights," "Illumina's azido patents," "Illumina's patented azido chemistry," "the Illumina patents," or simply, "Illumina's patented azidos." *See, e.g.*, Tr. 379:13-15, 402:4-5; Dkt. No. 571-5 (Wang) at 56:14-19; Dkt. No. 571-7 (Yu) at 36:14-21, 52:5-9, 83:14-18; Dkt. No. 571-6

(X. Xu) at 47:22-48:1; Tr. *1183:22-24, 1190:10-11*. Illumina also pointed to documents regarding "IP issues" or other general references not specific to any asserted patent or accused product. *See e.g.*, Tr. *1184:24-1185:6* (citing TX-713).

B. Illumina Did Not Prove Pre-Litigation Willfulness

1. Illumina Did Not Prove CGI Had Pre-Litigation Knowledge of Any Patent Other Than the '537 Patent

Illumina presented no evidence that CGI had knowledge before the litigation of any asserted patent other than the '537 patent, which Illumina has asserted only against StandardMPS, not CoolMPS. Tr. 831:1-5. Despite CGI's objections, Illumina repeatedly mischaracterized the 2015-2016 QIAGEN/Illumina dispute and the 2017-2018 CGI IPR petitions, which involved *only* the '537 patent, as involving ***all*** the asserted patents. *E.g.*, Tr. *1177:3-10*; Dkt. No. 571-5 (Wang) at 56:14-17; Tr. *379:13-15*; *id.* at *460:12-13, 463:6-8*; *id.* at *479:13-480:4*; TX-1783; TX-1803; TX-985; TX-985; TX-986; TX-987. Therefore, any evidence that CGI had knowledge of these proceedings demonstrates knowledge only of the '537 patent.

2. Illumina Did Not Prove That CGI Deliberately Infringed the '537 Patent

CGI's knowledge of the '537 patent could be relevant, if at all, to willfulness regarding StandardMPS activities in the United States. Illumina, however, did not present evidence showing any infringing StandardMPS activities in the United States after CGI learned of the '537 patent from the QIAGEN proceedings, around 2015-2016 at the earliest. On the contrary, the evidence showed that CGI took steps to ***avoid*** infringing the '537 patent by abandoning its plans to launch StandardMPS in the United States. Tr. 382:1-6, 385:22-386:5; Dkt. No. 571-6 (X. Xu) at 66:24-67:7, 72:10-74:2; Dkt. No. 571-5 (Wang) at 47:24-48:2, 52:9-14, 60:4-17, 65:13-66:3, 68:3-10; *cf. ABS Glob., Inc. v. Inguran, LLC*, No. 14-CV-503-WMC, 2016 WL 3996167, at *9 (W.D. Wis. July 22, 2016) (finding question of willfulness "moot" where accused infringer did not commercialize the allegedly infringing products). In addition, the evidence showed that StandardMPS was launched as a finished commercial product outside the United States in 2016, consistent with the idea that research and development activities in the United States at and after

this time were directed to CoolMPS, not StandardMPS. TX-714, at TX-714-043-066; Tr. 433:14-16, 435:23-25, 439:16-440:10. And Illumina's expert testified that the allegedly infringing research and development activities did not commence in earnest until late 2016 (Tr. *713:8-16*), when the infringing research activity would have been on CoolMPS, not StandardMPS.

Regarding CoolMPS, CGI witnesses testified that CoolMPS did not infringe the '537 patent, which is consistent with Illumina never asserting the '537 patent against CoolMPS. Dkt. No. 571-5 (Wang) at 49:7-10, 76:16-77:1; Tr. 331:9-332:2, 402:4-9, 419:20-420:3. Moreover, Illumina presented no evidence that Defendants were aware of or thought CoolMPS infringed any of the asserted patents, as willfulness requires. The evidence also showed that CGI had a good faith belief in the invalidity of the '537 patent at least up to the PTAB's denial of institution of CGI's IPR petitions in 2018, at which point CGI's research and development activities in the United States had moved to CoolMPS. Tr. 463:6-9, 571:6-590:15, 595:9-13, 614:5-10.

3. Illumina Did Not Prove That CGI Copied Any Illumina Technology, Let Alone Any Patented Technology

Given the lack of necessary evidence that 1) Defendants' StandardMPS was used in the United States after Defendants became aware of the '537 patent, or 2) pre-suit, Defendants knew about and thought CoolMPS infringed any asserted patent, any evidence of alleged copying is irrelevant to willfulness. Additionally, Illumina's evidence of "copying" does not show copying of Illumina's technology, let alone the required copying tied to any specific asserted patent. Instead, the evidence showed that CGI used Illumina reagents as controls, not to copy Illumina's technology. Tr. 287:21-25; *id.* at 451:5-11. Along the same lines, Illumina mischaracterized the statement that "Zebra is developed from XY," arguing that the statement demonstrated copying of Illumina's technology to develop CGI's Zebra sequencers. Tr. *1181:4-9*. The evidence showed that this statement referred to development of Zebra by CGI's team that previously worked with Illumina instruments, not to copying of those instruments.[16] Tr. 313:10-314:6, 342:9-12. Moreover, Illumina admitted that the Zebra development work that purportedly involved use of Illumina's technology took place in China, not in the United States. Tr. 451:12-17.

Illumina further argued that CGI "analyzed" Illumina's nucleotides, cleaving reagent, and software. Tr. *1181:15-17*. But "analyzing" does not prove copying and, in any event, the asserted patent claims do not cover a "cleaving reagent" or "software." Moreover, the evidence did not even show that CGI "analyzed" Illumina's nucleotides, but instead "analyzed" nucleotides ***CGI*** received from Acme Biosciences. Tr. 312:4-9. Notably, Illumina's expert testified that, based on his analysis, when CGI synthesized its own azidomethyl blocked nucleotides, it used Zavgorodny's prior art synthesis methodology. Tr. *671:12-18*. The evidence also did not show that CGI "analyzed" Illumina's "software," but instead showed that CGI used Illumina software and instruments to run reactions and analyze data generated from those runs. Tr. 342:24-344:20. Illumina also failed to present any testimony showing that CGI copied Illumina's cleaving reagent in its own products.

Illumina also argued that CGI's internal documents generally showed that CGI wanted to "mimic XY [Illumina]," meaning copy Illumina's technology, so that CGI's technology would work. Tr. *1181:24-1182:6*. But the evidence showed that the phrase "mimic XY" referred to "mimicking" the Illumina *dyes* so that Illumina's instruments could be used for CGI's development work. Tr. 494:12-25; 350:4-351:3. And Illumina's dyes are irrelevant to the asserted patent claims. Illumina similarly mischaracterized an internal communication from Dr. Zhang using the phrase "HiSeq like SBS reagents" to describe CGI's "Zebra" technology, arguing that this phrase demonstrated that the Zebra technology was copied from Illumina. However, the evidence showed that Dr. Zhang used the phrase "HiSeq like SBS reagents" to distinguish SBS (sequencing by synthesis) generally from sequencing by ligation (SBL) for an internal audience familiar with SBL but not SBS. Tr. 416:19-417:8. Notably, as Illumina's expert witness testified, Illumina did not invent SBS, so that the general phrase "HiSeq like SBS reagents" says nothing about any Illumina patented technology. Tr. *1105:4-14*.

C. Illumina Did Not Prove Post-Litigation Willfulness

Illumina asserted the '537 and '200 patents against StandardMPS on June 27, 2019 (Case

[16] There are no asserted claims that cover any aspect of an instrument itself.

No. 19-3770, Dkt. No. 1), when it was no longer being used in the U.S., and then the '444, '973, and '025 patents against CoolMPS and StandardMPS on February 27, 2020 (Dkt. No. 1). The Court summarily adjudicated that CoolMPS does not infringe the '025 patent. (Dkt. No. 469), and the jury invalidated the '444 patent. Thus, neither the '444 patent nor the '025 patent can be a basis for the jury's willful infringement finding through the research use of CoolMPS. Therefore, the willfulness inquiry in the post-litigation timeframe must show CGI willfully infringed the '973 patent through CoolMPS activities in the United States.

As a preliminary matter, Illumina presented no evidence of any infringing CoolMPS activities in the United States after February 27, 2020, the date on which Illumina brought suit, and the earliest date on which Defendants could be charged with knowledge of the '973 patent. That should end the matter. In addition, even if there were evidence of such activities, CGI had a reasonable basis to believe that CoolMPS did not infringe the '973 patent, and that the '973 patent was invalid. As reflected in the jury instructions, CGI did not dispute infringement of the '973 patent only after the Court's claim constructions. Tr. 100:6-9. According to CGI's proposed claim constructions for the '973 patent, in particular, the proposed construction based on the term "introduction," and the fact that the '973 patent requires incorporation of labeled nucleotides, CGI had a reasonable belief that CoolMPS does not infringe this patent. Dkt. No. 191 at 13-20; Dkt. No. 95-2 at 3-5; *see, e.g.*, *Gustafson*, 897 F.2d 508, 510-11.

Moreover, CGI relied on invalidating prior art combinations that no prior tribunal ever considered. In particular, CGI relies on the combination of Parce (JTX34), Kovacs (TX-3236), and Zavgorodny references (JTX7 and JTX51). CGI witness Dr. Radoje Drmanac and CGI's expert, Dr. Metzker, testified extensively at trial regarding the reasons that these references invalidate the '444 and '973 patents. *See, e.g.*, Tr. 590:16-594:9; *id.* at 834:2-855:17. Illumina's expert Dr. Romesberg's testimony further demonstrates that multiple aspects of Parce render it an appropriate reference for combination with Zavgorodny, including that Parce teaches removal of a 3'-*O* blocking group on a nucleotide using TCEP, that POSAs knew before the '973 that small blocking groups were preferred for SBS, that neither Parce nor '973 patent claim 13 includes an efficiency or read length requirement, and that instead, both the Parce reference and the asserted

Illumina claims require only two rounds of incorporation in SBS. Tr. *1108:3-23, 1109:3-9, 1112:16-1113:3*.

D. The Totality of the Circumstances Demonstrates No Willfulness

Based on the totality of the circumstances, JMOL of no willfulness should be granted. The evidence did not demonstrate that CGI had the intent to infringe any asserted patent, or that CGI copied any of Illumina's technology, let alone the patented technology. Instead, the evidence showed that CGI took steps to avoid infringement of the '537 patent pre-litigation, and had reasonable beliefs in non-infringement and invalidity of the '973 patent post-litigation. In addition, the evidence presented at trial demonstrated that CoolMPS is a new technology invented by CGI that offered improvements over traditional SBS technology platforms such as Illumina's. Tr. 595:9-597:19. For example, CoolMPS involves base-specific antibodies that are removed without leaving a "scar" on the incorporated base. *Id*. In addition, the use of antibodies permits more dye molecules to be used to identify each incorporated base—which provides a stronger signal and longer and more accurate sequence reads. *Id*.

III. CGI IS ENTITLED TO JMOL OF NO INDIRECT INFRINGEMENT

Illumina did not present substantial evidence showing Defendants indirectly infringed any asserted claims of the '444, '973, '537, and '200 patents. Illumina bears the burden of proving all elements of both induced and contributory infringement. 35 U.S.C. § 271(c); *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 843 F.3d 1315, 1332 (Fed. Cir. 2016); *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1320 (Fed. Cir. 2009). Defendants lacked the requisite knowledge and intent to establish indirect infringement. Plaintiff's counsel told the jury Dr. Romesberg "covered" indirect infringement (Tr. *1202:10*), but he only provided a vague answer to a single question to "provide some examples about how the defendants in this case collaborated together with respect to these infringing sequencing activities in California." Tr. *655:20-656:6*. The general corporate relationship among the Defendants that Illumina relied on for indirect infringement was insufficient given the lack of proof on the issues of knowledge and intent. *E.g.*, Tr. *1202:11-13* ("They all encouraged each other to infringe in ways that benefited. They shared costs, marketing. I'm going to go through this rather quick."). No reasonable jury could have

found that Defendants indirectly infringed any asserted claims of the '444, '973, '537, and '200 patents.

IV. CGI IS ENTITLED TO JMOL ON ANY DAMAGES BEYOND $295,000

A. The Damages Evidence

As no accused products were sold in the United States, the parties' damages experts agreed that the appropriate license structure would be a lump sum payment for a license to perform R&D in the United States. Tr. *690:3-11*; *id.* 947:14-23. Dr. Kearl used the WIPO Innovation Output Indices to calculate, on a year by year basis, the incremental benefit to BGI of conducting the accused R&D in the U.S. versus China, applying the innovation output differential for each year to any R&D expenditures that used the accused azidomethyl technology. Tr. 967:4-22, 972:20-24, 973:6-975:2. Dr Kearl then converted these amounts into 2014 present value dollars and applied a 50:50 bargaining split to arrive at damages of $295,000. Tr. 957:20-959:7, 975:3-15, 976:5-13, 1003:12-20. Last, Dr. Kearl showed that even under Dr. Prowse's methodology, the royalty attributable to R&D in the U.S. could be no more than $6.3 million. Tr. 943:21-944:4, 953:6-13, 954:11-19, 957:20-958:2. The jury's award of $8M, while substantially less than the $25.4M Illumina asked for, is still not supported by substantial evidence.

B. Substantial Evidence Does Not Support the Jury's Award

1. Dr. Prowse Failed to Take Into Account the Available Non-Infringing Alternative of Performing the Accused R&D Activities Outside the U.S.

Binding Federal Circuit precedent holds that "[t]he economic relationship between the patented method and non-infringing alternative methods, of necessity, would limit the hypothetical negotiation." *Riles v. Shell Expl. & Prod. Co.*, 298 F.3d 1302, 1312 (Fed. Cir. 2002); *Grain Processing Corp. v. Am. Maize-Prod. Co.*, 185 F.3d 1341, 1350–51 (Fed. Cir. 1999). In this case, the infringing acts that form the basis for a reasonable royalty award are CGI's R&D activities only. Illumina's request for $25.4M was based on the assumption that doing the accused research in China was not possible, and thus it was not a non-infringing alternative. Tr. *709:19-22*. The evidence was otherwise. Illumina's damages expert, Dr. Prowse, relied on Dr. Romesberg for "the difficulty or lack thereof of moving to China." Tr. *716:21-24*. Yet, Dr. Prowse admitted that Dr.

Romesberg "does not opine that moving the accused R&D operations out of the United States could not be done." Tr. *717:3-5*. Dr. Romesberg testified that CGI's sequencing experiments could "be run in another place like China" and that he had done collaborative research with individuals who carried out the experiments in China. Tr. *667:5-15, 661:18-21, 662:15-663:18.* CGI presented uncontested evidence that the R&D could have been done outside the U.S., for example in Australia or Canada, or in China where the Defendant entities already had substantial research, development, and manufacturing operations. Tr. 356:20-357:15, 413:7-23, 602:16-20; *id.* at *661:4-21, 662:15-663:2, 666:12-667:15*; *id.* at 948:25-949:23.

Dr. Prowse relied on Dr. Drmanac's statement that "excluding U.S. scientists from evaluating CoolMPS [would] slow down its development and could lead to a product which is not as robust as it might otherwise be. This will likely set back the development of our technology worldwide." TX-1541-007; Tr. *698:12-699:5, 715:1-5*. But as Dr. Prowse acknowledged, this statement was forward-looking and made in 2020, ***six years*** after the hypothetical negotiation in 2014. It had nothing to do with having development of the product, rather than evaluation, done outside the United States. Tr. *715:17-716-5*. Even if this statement were somehow relevant to moving R&D to China at all, Dr. Prowse made no attempt to analyze any differences between moving the accused R&D operations to China in 2020 (when Dr. Drmanac made this future-looking statement), as opposed to 2014 (the date of the hypothetical negotiation). Tr. *715:13-16*. As there was not substantial evidence to support Dr. Prowse's assumption that performing the R&D activities in China, Canada, or Australia was not a viable non-infringing alternative, his opinion cannot support ***any*** damages award, much less $8 million.[17]

2. Dr. Prowse Ignored the Time-Value of Money

The hypothetical negotiation approach "attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began." *Lucent*, 580 F.3d at 1324. Further, there is no dispute with the simple proposition that

$100 at some point in the future is worth less than $100 today. Tr. 719:5-7; *id.* at 954:25-956:4. Thus, discounting to present value is necessary to "take into account the time value of money to avoid overcompensating the injured party." *Looksmart Grp., Inc. v. Microsoft Corp.*, No. 17-CV-04709-JST, 2019 WL 4009263, at *3 (N.D. Cal. Aug. 5, 2019); *see also Energy Cap. Corp. v. United States*, 302 F.3d 1314, 1333 (Fed. Cir. 2002).

Dr. Prowse, however, did nothing to discount the return on 2016-2020 R&D expenditures to 2014 dollars to account for when the hypothetical negotiation would have taken place, and the lump sum royalty would have been paid. Rather, he simply calculated the 2016-2020 expenditures for accused R&D ($149.8 million) and applied the 17% rate of return to arrive at his reasonable royalty. He treated ***all*** the R&D expenditures from 2016 onwards as if they were spent (and associated later returns were obtained) in 2014. Dr. Prowse testified that he did not need to discount these R&D expenditures for "risk or uncertainty" because they are "actual expenses that we know occurred." Tr. 692:5-13. But the economic certainty of the time value of money applies whether the expenditures are certain or not and Dr. Prowse did not show otherwise. The only evidence that properly discounted future returns on R&D investments back to their present value in 2014 is that of Dr. Kearl. Tr. 956:14-957:19; 975:3-15.

3. Dr. Prowse Improperly Inflates the Expenditures on Accused R&D

To calculate CGI's spending on accused R&D between 2016 and 2020, both parties' experts relied on a spreadsheet of all CGI R&D expenditures between 2014 and 2020. JTX082. Dr. Prowse included all line items that CGI's CFO Mr. Chaturvedi stated were "related to the DNBseq technology," because he assumed all such R&D was infringing. Tr. 691:10-18, 721:9-18. This assumption was not supported by any evidence. Dr. Prowse admitted he did not rely on any technical experts to justify his assumption that all R&D done on "DNBSEQ technology" infringed. Tr. 722:6-9. CGI's CFO Mr. Chaturvedi certainly did not and could not testify to that. Dkt. 571-2 (Chaturvedi) at 296:2-297:3. Rather, Dr. Drmanac, the only knowledgeable fact

[17] Illumina may point to the Court's *Daubert* ruling, but the Court specifically left open question of whether there would be substantial evidence to support his assumption of impossibility of (footnote continued)

witness on the subject, testified that all R&D related to DNBSEQ did ***not*** use the azidomethyl that formed the basis of Illumina's infringement claims. Tr. 602:21-603:2. As there was no basis for Dr. Prowse's assumption that the line items he pointed to in CGI's R&D expenditure spreadsheet corresponded to infringing R&D activities, his flawed $149.8 million royalty base cannot support a damages award. The only evidence presented at trial of CGI's R&D projects that actually used the patented azidomethyl technology is that of Dr. Kearl, who testified that based on a conversation with Dr. Drmanac, the Chief Science Officer at CGI, the total expenditures for projects that ***actually touched on the infringing azidomethyl blocking technology*** was $108.4 million. Tr. 962:2-22; 964:1-18.

4. Illumina Would Not Take 100% of the Benefit of Doing Research in the U.S.

Dr. Prowse recognized the need for a bargaining split of the benefits of the patents, stating he "split the benefits of the use of the patents-in-suit . . . between the parties" by allowing BGI to keep the return it receives from "the continuing R&D they did initially at CGI, the R&D they're performing in China related to the accused products, and the return they get on their sales and marketing and manufacturing expenses." Tr. *702:16-703:5*; *see also* Dkt. 596 at PDX-7.295. But none of these activities are even accused of infringement in this case. Dr. Prowse's "split" allocates all the benefits of research in the U.S. to Illumina, and allocates the benefits of non-infringing activities that are unrelated to the patents-in-suit to CGI. Under Dr. Prowse's analysis, Defendants take ***nothing*** from the bargaining table. Courts routinely hold that expert opinions allocating 100% of the benefit of the patents-in-suit to the plaintiff are unreasonable and unreliable. *Contour IP Holding, LLC v. GoPro, Inc.*, No. 3:17-CV-04738-WHO, 2020 WL 5106845, at *14 (N.D. Cal. Aug. 31, 2020) ("unreasonable and unreliable for [expert] to conclude that 100% of profits associated with the infringing technology would go to [the patentee]."); *see also Looksmart*, 2019 WL 4009263, at *2-3; *Nordock Inc. v. Sys. Inc.*, 2013 WL 989864, at *8 (E.D. Wis. Mar. 13, 2013). The only valid opinion presented at trial is that the parties would have

moving the accused R&D to China was still live at trial. *See* Dkt. 450 at 7-8.

split the benefits of the patents roughly in half, given their equal bargaining strength at the hypothetical negotiation with respect to R&D. Tr. 957:20-959:12.

C. The Proper Remedy for the Lack of Competent Evidence to Support the Damages Verdict Is JMOL for $295,000

A new trial is not appropriate, and reduction of the damages award as a matter of law is required, where the plaintiff has produced no evidence in support of a legally viable damages theory that could allow for an award greater than what the defendant proposed. For example, in *Tronzo v. Biomet, Inc.*, 236 F.3d 1342 (Fed. Cir. 2001), the Federal Circuit upheld the reduction of a damages award from $7,134,000 to $520, and held that it should not be treated as a remittitur or otherwise allow for a new trial on damages. The *Tronzo* court explained that the district court "awarded the maximum damages possible given the lack of competent evidence" for an award greater than $520. *Id*. at 1351.

This case falls squarely within the rationale of *Tronzo*. Illumina chose to pursue a damages theory that is unsupportable as a matter of law and eschewed any alternative damages theory that could be supported by the law and the evidence. There is no legal or logical basis to allow Illumina a second bite at the apple. *See also Promega Corp. v. Life Techs. Corp.*, 875 F.3d 651 (Fed. Cir. 2017) (Plaintiff is not necessarily entitled to damages or a new trial where it fails to put on a legitimate damages case). The only damages evidence that properly takes into account the law and hypothetical negotiation construct, considers the available non-infringing alternative of conducting the accused R&D activities in China, Australia, or Canada, and thus the only evidence that is based on a legally permissible theory of damages, is CGI's evidence.

Furthermore, as described above in Sections I.A-B, CGI is moving for JMOL on invalidity of the '973 patent. If granted, this further shows that Dr. Prowse's damages number is improper. The jury has already found the '444 patent invalid. With the '973 patent invalidated, any R&D activities specific to CoolMPS would have been non-infringing. If the '973 patent is found invalid, Dr. Prowse's damages calculations—based on expenditures between 2016 and 2020—would include multiple years of expenditures for non-infringing activities.

V. CONCLUSION

For the foregoing reasons, CGI respectfully requests that the Court grant this motion for judgment as a matter of law. In the alternative, to the extent these arguments are not sufficient to find grant JMOL in favor of CGI, a new trial is justified, including for the reasons set forth in CGI's separate Motion for a New Trial.

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Respectfully submitted,

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